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10/825,587

04/14/2004

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EXAMINER

CANTELMO, GREGG

ART UNIT

PAPER NUMBER

1795

MAIL DATE

DELIVERY MODE

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PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

<b>Office Action Summary</b>	<b>Application No.</b> 10/825,587	<b>Applicant(s)</b> VISCO ET AL.	
	<b>Examiner</b> Gregg Cantelmo	<b>Art Unit</b> 1795	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 26 December 2007.
- 2a) ☒ This action is **FINAL**.                      2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-18 and 20-22 is/are pending in the application.
- 4a) Of the above claim(s) 4,6,15-18 and 22 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-3,5,7-14,20 and 21 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \*    c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
  - ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |  |   |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892)                       | 4) <input type="checkbox"/> Interview Summary (PTO-413)           |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)   | Paper No(s)/Mail Date. _____                                      |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date <u>SEE OFFICE ACTION</u> .                                       | 6) <input type="checkbox"/> Other: _____                          |

## **DETAILED ACTION**

### ***Response to Amendment***

1. In response to the amendment received December 26, 2007:
  - a. Claims 1-19 and 20-22 are pending with claims 4, 6, 15-18 and 22 withdrawn from consideration;
  - b. The specification objections have been overcome in light of the amendment. Applicant is advised to monitor the status of the remaining patent applications identified in the specification since they may soon mature into a corresponding U.S. patent (see 10/772,228 in the paragraph bridging pages 11 and 12);
  - c. The objections and rejections to claims 19 and 23 have been overcome in light of the cancellation of claims 19 and 23;
  - d. The 112 rejections have been overcome in light of the amendment;
  - e. The prior art rejections of record stand.

### ***Double Patenting***

2. The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the "right to exclude" granted by a patent and to prevent possible harassment by multiple assignees. A nonstatutory obviousness-type double patenting rejection is appropriate where the conflicting claims are not identical, but at least one examined application claim is not patentably distinct from the reference claim(s) because the examined application claim is either anticipated by, or would have been obvious over, the reference claim(s). See, e.g., *In re Berg*, 140 F.3d 1428, 46 USPQ2d 1226 (Fed. Cir. 1998); *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970); and *In re Thorington*, 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

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A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) or 1.321(d) may be used to overcome an actual or provisional rejection based on a nonstatutory double patenting ground provided the conflicting application or patent either is shown to be commonly owned with this application, or claims an invention made as a result of activities undertaken within the scope of a joint research agreement.

Effective January 1, 1994, a registered attorney or agent of record may sign a terminal disclaimer. A terminal disclaimer signed by the assignee must fully comply with 37 CFR 3.73(b).

3. Claims 1-3, 5, 7-14, 19 and 23 a are provisionally rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claims of copending Application No. 10/772,157. Although the conflicting claims are not identical, they are not patentably distinct from each other.

Copending Application No. 10/772157 claims an electrochemical cell comprising: an active metal anode having a first surface end a second surface; a cathode structure comprising an electronically conductive component, an ionically conductive component, and an electrochemically active component, wherein at least one cathode structure component comprises an aqueous constituent; an ionically conductive protective membrane on the first surface of the anode, the membrane comprising, one or more materials configured to provide a first surface chemically compatible with the active metal of the anode in contact with the anode, and a second surface substantially impervious to and chemically compatible with the cathode Structure and in contact with the cathode structure (Claim 1 as applied to instant claim 1). The cathode structure employs water which is the active component (claim 3 as applied to claims 1 and 5). The anode material is lithium (claim 44 as applied to claims 1, 9 and 14).

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The protective membrane is a composite comprising first and second materials having identical compositions (claim 50 as applied to claim 2) and the membrane has the same requisite ionic conductivity (claim 49 as applied to claim 3).

The membrane is a laminate (claim 51 as applied to claim 7) and has a graded composition (claim 52 as applied to claim 8).

The first component is a composite reaction product of active metal with  $\text{Cu}_3\text{N}$ , active metal halides, active metal phosphides and active metal halides and active metal phosphorous oxynitrides (claim 53 as applied to claim 10) or a composite reaction product of active material with  $\text{Cu}_3\text{N}$ ,  $\text{Li}_3\text{N}$ ,  $\text{Li}_3\text{P}$ , and  $\text{LiI}$ ,  $\text{LiBr}$ ,  $\text{LiCl}$ ,  $\text{LiF}$  and  $\text{LiPON}$  (claim 55 as applied to claim 11).

The second composite comprises a material selected the group consisting of glassy or amorphous metal ion conductors, ceramic active metal ion conductors, and glass-ceramic active metal ion conductors (claim 56 as applied to claim 12) and has the same composition as that of claim 13 (see claim 57).

As to claim 19, the product of the claim is defined by the limitations set forth in claim 1 and as for the reasons set forth above, is not held to be further limiting to the product of claim 1. Since claim 1 has been obviated by the claims of Copending Application No. 10/772157 as discussed above, and since claim 19 fails to further limit the product of claim 1 and thus recites the same product, Copending Application No. 10/772157 is held to reasonably render obvious the invention of claim 19 for the same reasons applied to claim 1.

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Claim 23 recites a combination of the cell of claim 5 and a PEM fuel cell connected to the cell of claim 5 to capture hydrogen released from the cell. However the claimed product of both of claims 5 and 23 are to the cell itself. Since claim 5 has been obviated by the claims of Copending Application No. 10/772157 as discussed above, and since claim 23 fails to further limit the product of claim 5 and thus recites the same product, Copending Application No. 10/772157 is held to reasonably render obvious the invention of claim 19 for the same reasons applied to claim 5.

While the exact scope of the claims in each application are not verbatim, the invention claimed in both the instant application and in copending Application No. 10/772157 are reasonably obvious over one another and thus not held to be patentably distinct.

This is a provisional obviousness-type double patenting rejection because the conflicting claims have not in fact been patented.

### ***Claim Rejections - 35 USC § 102***

4. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

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5. Claims 1-5, 7-14, 19-21 and 23 are rejected under 35 U.S.C. 102(e) as being anticipated by U.S. Patent Application Publication No. 2004/0197641 (Visco).

The applied reference has a common inventor with the instant application. Based upon the earlier effective U.S. filing date of the reference, it constitutes prior art under 35 U.S.C. 102(e). This rejection under 35 U.S.C. 102(e) might be overcome either by a showing under 37 CFR 1.132 that any invention disclosed but not claimed in the reference was derived from the inventor of this application and is thus not the invention "by another," or by an appropriate showing under 37 CFR 1.131.

Visco claims an electrochemical cell comprising: an active metal anode having a first surface and a second surface; a cathode structure comprising an electronically conductive component, an ionically conductive component, and an electrochemically active component, wherein at least one cathode structure component comprises an aqueous constituent; an ionically conductive protective membrane on the first surface of the anode, the membrane comprising, one or more materials configured to provide a first surface chemically compatible with the active metal of the anode in contact with the anode, and a second surface substantially impervious to and chemically compatible with the cathode structure and in contact with the cathode structure (Claim 1 as applied to instant claim 1). The cathode structure employs water or air which is the active component (claims 3 and para. 19 as applied to claims 1, 4 and 5). The anode material is lithium (claim 44 as applied to claims 1, 9 and 14).

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The protective membrane is a composite comprising first and second materials having identical compositions (claim 50 as applied to claim 2) and the membrane has the same requisite ionic conductivity (claim 49 as applied to claim 3). The

The membrane is a laminate (claim 51 as applied to claim 7) and has a graded composition (claim 52 as applied to claim 8).

The first component is a composite reaction product of active metal with  $\text{Cu}_3\text{N}$ , active metal halides, active metal phosphides and active metal halides and active metal phosphorous oxynitrides (claim 53 as applied to claim 10) or a composite reaction product of active material with  $\text{Cu}_3\text{N}$ ,  $\text{Li}_3\text{N}$ ,  $\text{Li}_3\text{P}$ , and  $\text{LiI}$ ,  $\text{LiBr}$ ,  $\text{LiCl}$ ,  $\text{LiF}$  and  $\text{LiPON}$  (claim 55 as applied to claim 11).

The second composite comprises a material selected the group consisting of glassy or amorphous metal ion conductors, ceramic active metal ion conductors, and glass-ceramic active metal ion conductors (claim 56 as applied to claim 12) and has the same composition as that of claim 13 (see claim 57).

The cell is supplemented with fresh lithium metal to provide continuous operation in the presence of a bonding coat such as silver (paragraphs 87 and 188 as applied to claims 19, 20 and 21). As to claim 19, the product of the claim is defined by the limitations set forth in claim 1 and as for the reasons set forth above, is not held to be further limiting to the product of claim 1. Since claim 1 has been taught by Visco as discussed above, and since claim 19 fails to further limit the product of claim 1 and thus recites the same product, Visco is held to reasonably anticipate the invention of claim 19 for the same reasons applied to claim 1.



Claim 23 recites a combination of the cell of claim 5 and a PEM fuel cell connected to the cell of claim 5 to capture hydrogen released from the cell. However the claimed product of both of claims 5 and 23 are to the cell itself. Since claim 5 has been taught by the claims of Visco as discussed above, and since claim 23 fails to further limit the product of claim 5 and thus recites the same product, Visco is held to reasonably anticipate the invention of claim 19 for the same reasons applied to claim 5. Furthermore Visco claims the same combination (see claim 23 of Visco).

6. Claims 1, 3-4, 9, 14 and 19 are rejected under 35 U.S.C. 102(b) as being anticipated by JP 55-081471 A (JP '471).

JP '471 discloses a lithium/air cell comprising a lithium anode 4, a porous cathode 2 and a solid electrolyte 5 disposed between the cathode and anode (abstract and Fig. 1 as applied to generic claim 1).

Li3N is the same type of material disclosed in the instant application for one of the layers and thus is held to exhibit the same requisite ionic conductivity required in claim 3.

The cathode oxidant comprises air (abstract as applied to claim 4).

The anode is solid-state lithium (as applied to claims 9 and 14).

As to claim 19, the product of the claim is defined by the limitations set forth in claim 1 and as for the reasons set forth above, is not held to be further limiting to the product of claim 1. Since claim 1 has been anticipated by JP '471 as discussed above, and since claim 19 fails to further limit the product of claim 1 and thus recites the same

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product, JP '471 is held to reasonably render obvious the invention of claim 19 for the same reasons applied to claim 1.

***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

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7. Claims 2, 7 and 10-12 are rejected under 35 U.S.C. 103(a) as being unpatentable over JP '471 as applied to claim 1 above, and further in view of U.S. Patent No. 5,314,765 (Bates).

The first material is Li<sub>3</sub>N which is an identical material to those claimed active metal nitrides and thus broadly reads on the Markush groups of claims 10 and 11).

The teachings of claim 1 have been discussed above and are incorporated herein.

JP '471 does not appear to expressly disclose of the conductive protective membrane being a multilayer structure (claim 2); that the membrane is a laminate (claim 7) or that the second material is a group of materials recited in claim 12.

Bates teaches of providing a multilaminate composition comprising a first layer of Li<sub>3</sub>N and a top layer of LiPON thereon (Fig. and col. 2, ll. 50-65).

The addition of a top layer of LiPON to the system of JP '471 would have improved the life of operation of the cell of JP '471 by protecting the reactive anode from other components in the system.

8. Claim 5 is rejected under 35 U.S.C. 103(a) as being unpatentable over JP '471 as applied to claim 1 above, and further in view of U.S. Patent No. 3976509 (Tsai).

The teachings of claim 1 have been discussed above and are incorporated herein.

JP '471 does not appear to expressly disclose water as the cathode fluid oxidant.

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While JP '471 discloses using air for the cathode fluid oxidant, use of other oxidant sources such as water in lithium electrochemical cells has been well established in the art as taught by Tsai (abstract).

Therefore it would have been obvious to one of ordinary skill in the art at the time the claimed invention was made to modify the teachings of JP '471 by using any number of cathode fluid oxidants including water since such materials have been established cathode fluids in the art as taught by Tsai and since it has been established that the selection of a known material based on its suitability for its intended use supported a prima facie obviousness determination in *Sinclair & Carroll Co. v. Interchemical Corp.*, 325 U.S. 327, 65 USPQ 297 (1945) See also *In re Leshin*, 227 F.2d 197, 125 USPQ 416 (CCPA 1960). MPEP § 2144.07.

9. Claim 13 is rejected under 35 U.S.C. 103(a) as being unpatentable over JP '471 in view of Bates as applied to claim 12 above, and further in view of U.S. Patent No. 6,485,622 (Fu).

The difference not yet discussed is of the particular material of claim 13 for the second component.

Fu teaches that the same lithium ion conductive glass-ceramic material is known in the art for use in lithium electrochemical cells (abstract as applied to claims 20 and 28). These materials include ionic conductivities of  $10^{-4}$  S/cm (Table 2),  $10^{-4}$  S/cm being held to be "about"  $10^{-3}$  S/cm (as applied to claim 7). The composition has an increased ionic conductivity as well as enhanced thermal stability within electrochemical devices.

Therefore it would have been obvious to one of ordinary skill in the art at the time the claimed invention was made to modify the teachings of JP '471 in view of Bates by selecting the second material to be the lithium ion conductive glass-ceramic material taught by Fu since it would have provided a material which provided both protection to the anode as well as increased the ionic conductivity of the protection composite in the cell. The selection of a known material based on its suitability for its intended use supported a prima facie obviousness determination in *Sinclair & Carroll Co. v. Interchemical Corp.*, 325 U.S. 327, 65 USPQ 297 (1945) See also *In re Leshin*, 227 F.2d 197, 125 USPQ 416 (CCPA 1960). MPEP § 2144.07.

### ***Response to Arguments***

10. Applicant's arguments filed December 26, 2007 have been fully considered but they are not persuasive.

Applicant argues that the Visco reference does not qualify as prior art under 102(e).

The Examiner respectfully disagrees.

The Visco reference is a CIP of 10/686189 which claim priority to provisional application 60/418899 filed October 15, 2002. In addition the Visco reference claim priority to provisional application 60/511710 filed October 14, 2003. All of which pre-date the earliest effective filing date of the instant application and thus does in fact appear to qualify under 102(e).

Applicant argues that the prior art rejections and double patenting rejection do not teach or suggest of a renewable active metal anode which is configured for supplementation of the active metal.

The Examiner disagrees.

First the term renewable does not require renewing of the anode but only that the anode is able to be renewed to any extent.

Second the language configured for supplementation is also relatively broad in that the configuration can be any configuration for providing additional active metal to the system

Thus in the broadest sense the claims encompass removing and replacing of the anode with new anode material if need be and with that, the prior art of record and claims in the double patenting rejection are still held to be “renewable” and “configured for supplementation”.

Therefore the rejections stand.

### ***Conclusion***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Gregg Cantelmo whose telephone number is 571-272-1283. The examiner can normally be reached on Monday to Thursday, 8:30-6:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Pat Ryan can be reached on 571-272-1292. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Gregg Cantelmo/  
Primary Examiner, Art Unit 1795